

1940

The  
Variation of Animals  
in Nature

G. C. Robson & O. W. Richards

1936

Longmans, Green & Co.

(徳田氏蔵書印)

p.1. Whether the study of variation under domestication has the importance in evolutionary studies that Darwin originally assumed is very doubtful.

p.3. In spite of the considerable changes that have taken place in evolutionary inquiry, the fundamental idea enunciated by Darwin and Wallace that evolutionary divergence is the summation of a series of changes having the status of individual differences is still almost universally accepted. Students of evolution are still concerned with its questions—how do such variations arise and by what means are they amplified so as to give progressive change in given directions?



• 2. 7' 21' mutation in 1218' variation in the genetic basis of character' 7 景 昨 在

origin of mutation = 突变论

- [illegible]

origin of variation

mutation & variation = 突变 & 变异 前者是点突变, 后者是 染色体变异  
variation in population = simultaneously arise 同时出现 & 分散  
scattered = independent = arise 同时出现, 分散 & 独立

Chapter III 第三、四章

species = homogenous ( $\alpha$ )  $\psi \neq$  markedly diversified element (Rassemblement) =  $\beta + \gamma + \delta + \epsilon$

2/ homogeneity of narrow area /  $\chi^2$  test / large area /  $\chi^2$  test.

② evolutionary standpoint の point の 1 つ element の mutation  
 1 - 群が 1 gene. 又 2 個 element = 2 個 for mutation の 1 - 群 = coding  
 1 - 群が 2 個 = 独立の diversity を evolve の 1 - 群 = ~~2 個~~ の 1  
 1 個 2 個 = 2 個

Chapter IV カラノ印

Reason 1. コレニイテ後ノ $\frac{1}{2}$ ハ=1頃イテ中ルヨリテアル。

p. 127 What we find is a gradation from single variants or variants represented only by a low percentage in the population, to larger and more distinctive assemblages and eventually to distinct regional geographical groups.

the structure + environment + ... , 社会 + 环境 + 文化 + 经济 + 政治 + 法律 + 道德 + 宗教 + 艺术 + 科学 + 技术 + 教育 + 体育 + 卫生 + 娱乐 + 休闲 + 旅游 + 交通 + 通信 + 能源 + 材料 + 农业 + 工业 + 商业 + 服务业 + 金融业 + 房地产业 + 建筑业 + 采矿业 + 制造业 + 批发业 + 零售业 + 餐饮业 + 住宿业 + 信息业 + 文化业 + 体育业 + 娱乐业 + 旅游业 + 交通运输业 + 仓储业 + 邮政业 + 电信业 + 电力业 + 燃气业 + 水利业 + 林业 + 畜牧业 + 渔业 + 农业 + 工业 + 商业 + 服务业 + 金融业 + 房地产业 + 建筑业 + 采矿业 + 制造业 + 批发业 + 零售业 + 餐饮业 + 住宿业 + 信息业 + 文化业 + 体育业 + 娱乐业 + 旅游业 + 交通运输业 + 仓储业 + 邮政业 + 电信业 + 电力业 + 燃气业 + 水利业 + 林业 + 畜牧业 + 渔业 + 农业

60年前 = Australia, New Zealand  $\approx \frac{2}{3}$  wallaby +

\* 1919 Allen, Bergmann, Gloger / 'Law' 7 2022!



possibile che la densità sia diversa?  $\rho$  può essere diversa da  $\rho_0$  se  $\rho_0$  è la densità di riferimento.  $\rho$  può essere diversa da  $\rho_0$  se  $\rho_0$  è la densità di riferimento.  $\rho$  può essere diversa da  $\rho_0$  se  $\rho_0$  è la densità di riferimento.

2. 汽缸 2.54, 量 2.10 1.90 1.70

selection  $\pi$  (1/176) mass mutation = 0.00188  $\approx 1/531$

$\mathcal{R}$  = biological race, origin + 1)  $\in \{1\}$  evolution + 1) 1) 2)  $m$ .

main 食性, 変化の biological race, origin + rev. 33/1004  
変化の single individual 33/42, 111 descendant = 33/3  
to 33/1004. 111 a mass mutation = 33/3 + 1004/1004.

Rensch, geographische Rassenkreise + 地理的 界 + 種 subspecies  
+ 種 + 成立 = 自然淘汰説 + 地理的 上の 界 + 種 Robson 同

p. 129. We would do not wish to ignore the many and striking cases of structural and environmental trends. We would even admit that in such cases mass transformation of populations may be possible. 土の人口中心の移動

7/1/50 Variation + environment 1/10/4/53, 13/9/50  
species 又 geographical race (or subspecies), 分布, 成立  
1/1/4 7 分布 + 1/4 分布 + Willis (1922), age and area  
theory 分布 + 1/4, 1/4 Riley (1924) 1/2 分布 + 1/4 分布 +  
1/4 分布 + 1/4, Robson 1/4 1/4 1/4, 1/4 1/4 1/4 1/4  
p.86. we hardly believe it feasible to test that

hypothesis with reference to the area occupied by related subspecies. Willis's theory seems to have a partial validity; but, as Rolson (1928, p. 114) has suggested, we are not justified in dealing with it as of prime importance in explaining differences in distribution.

1907 Robson & Willis, corollary to 'wave theory'

7 呈 出 証 書

related species, (带状)分布, 沿环境 environmental gradient + correlate 分布 + 环境 + 分布

p. 78 Hewitt (1925 p. 263) ~~and~~ Snodgrass (1903, p. 411) ~ 27"  
 27 successive waves of migration = 27-27

Hewitt (l.c. p. 274) specifically states that the series he studied are phylogenetic.

Solution,  $\vec{r}_1 = \hat{i} + \hat{j}$ ,  $\vec{r}_2 = \hat{j} + \hat{k}$ ,  $\vec{r}_3 = \hat{i} + \hat{k}$

## Chap. VII Natural Selection

### 1. Darwin's statement of the evidence.

p. 182 Throughout the work Darwin does not clearly distinguish between Evolution as an historical process and Natural Selection as the effective agent. 771 Evolution 772-773 1948 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

In Darwin's treatment of the subject no proof is adduced that a selective process has ever been detected in nature. Throughout the work such a process is suggested and assumed: its actual occurrence is nowhere demonstrated. 771 p. 183 the mainstay of the case is the analogy between Artificial and Natural Selection. 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

### 2. Subsequent Confirmation and Development of the theory.

#### I. Artificial Selection

#### II. Direct Evidence for Natural Selection

#### ~~2. Subsequent Confirmation and Development~~

#### III. The Nature of Variation

#### IV. Indirect Evidence for and against the Natural Selection theory

### A. Indirect evidence for the occurrence of Natural Selection

#### a) Standard cases

- 1) Protective resemblance and warning coloration
- 2) Mimicry

#### b) Less intensively studied cases

- 1) Adaptation of torrent-living animals
- 2) The colour of cuckoo's egg
- 3) The deep-sea fauna
- 4) Cave animals

### B. Difficulties raised by the Natural Selection theory

- 1) Specific differences in colour and structure
- 2) The problem of secondary sexual characters
- 3) The origin of habits
- 4) Complex organs and 'co-adaptations'













We have here for the first time an explanation in strictly Darwinian lines of several orthopteran processes.

however much the living organism is limited and confined by its environment and the necessity of conforming

thereto, it still retains a measure of freedom.

not objectionable to argue that, if some instincts have a latitude that transcends the exigencies of mere survival value, as it is currently conceived, it is not unlikely that the same is true of structural modification.

Indeed a very great variety of instincts and habits impress themselves on us in this way, viz. as the product of non-adaptive tendencies arising within the organism itself.

Nevertheless we have as yet no positive evidence as to how such changes come to characterize whole populations.



$\Delta c > 0$  adaptive +  $\Delta c$  natural selection  $\neq$  establish  $\Rightarrow$   $\Delta c > 1/2$   
 Darwinian theory  $\neq$   $\Delta c$   $\Delta c$  = non-adaptive +  $\Delta c$  not  $> 1$  theory  
 3' apply  $\Rightarrow$   $\Delta c$  natural selection  $\neq$  establish  $\Rightarrow$   $\Delta c > 1/2$   $\Delta c > 1/2$   
 $\Delta c > 1/2$   $\Delta c$

Fisher-Haldane & Wright The selective theories supply us, theoretically at least, with an explanation of both the change and its spread. (p. 343) + 17 12 + 50%, 21% 21% 21% 21%  
+ + mass-mutation theory 9 18 + 21% \* 21%

[illegible]

{ Adaptation + 1.197 适应力  
{ adaptation + evolution + 1.197 进化

2. 生物が生存するために 4m 環境-adapt する

こは、1797年、魚が「ニルグー」を捕まへ、鳥が「ナリタギルトイフコト」、ア

$\hat{\theta} = \frac{1}{n} \sum_{i=1}^n x_i$  が尤度関数。  $n \rightarrow \infty$  のとき、 $\hat{\theta}$  は  $\theta$  に収束する。  $\theta$  は adaptation.

77777777. 217 8147 2887 organization, 1187 ~~specific~~

specialization  $r=3$ . specific character  $\sim sp \& \uparrow \Delta \frac{p}{m} = \Delta \frac{p}{m} \sim 2v$ .  $2/$

211 - 21 adaptive meaning 不明 + 1.2, 7.25 4-1.2 minor

✓ 17 ~~the~~ selectionist, 37% "transformation of population"

It is usual to proceed on the assumption that, if all evolutionary divergence were adaptive, the importance of Natural Selection would be finally demonstrated. (p. 348)

adaptation + evolution = 15/17

4. adaptation, 適応, is origin of the word. it seems quite certain that adaptation itself appears to be established by the same sorts of changes that lead to the divergences of races and species. (p. 369) +





$\alpha = \chi_1 \times \dots$  are attributes of individuals  $x_1, \dots, x_n$  (individuals) in the set  $N$ .  
In the paper [1] it was shown that if  $\alpha = \chi_1 \times \dots$ , p. 365 The suggestion  
that an elaborate system of internal relations (as well as  
external relations) is perpetually being improved by a  
series of entirely random mutations is not convincing,  
but no other equally concrete explanation, supported by  
direct observation, can be brought forward. We suggest  
that as far as internal relations are concerned the  
organism itself may in some sense initiate new  
steps forward,  $\alpha = \chi_1 \times \dots$ ,  $\beta = \chi_1 \times \dots$

[illegible]

結 論

1. Natural Selection theory = 28.7 p. 371. There is no a priori reason for considering that Natural Selection must have a universal activity, even if its efficacy is demonstrated in particular cases.
2. Orthogenesis = 28.7 p. 372, ... the disability that it does not account for the transformation of populations except on the assumption that such changes occur en masse.
3. mass mutation = 28.7 p. 369, It is possible that changes of an adaptive kind have arisen through mutations occurring en bloc; but at present there is little evidence to support this belief.
4. 28.2 = alternative 28.7 29 Natural Selection = 28.7 p. 373, We may, perhaps, claim to have shown that group formation is, in part at least, independent of Natural Selection. in p. 374 = ~~In this respect~~ we ought not to forget that after all one of the tests of an evolutionary theory is its capacity to account for the spreading of variants and the transformation of populations. In this respect, as we have admitted, Natural Selection enjoys a strong theoretical advantage. 28.7 Haldane-Fisher, theory 7 @ 28.7 Natural Selection 28.7 102 28.7 28.7 28.7



進化の目的 = 秩序、evolution + purposiveness + 目的性

秩序の目的 = 目的性。目的性 = 秩序性 + 目的性。

p. 374. If this organizing activity is indeed an agent in producing the main adaptive tendencies in evolution, it might be argued that the gradual upbuilding and perfection of adaptations, because they involve so large an element of design, must also involve some reference to a purpose independent of survival value and chance, and existing as an end in itself. We have to admit that, if we were to relegate survival value to a subordinate rôle in the causation of evolution, the element of design and purposefulness has to be explained.

(Apr. 8, 1940)